

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q90831

Yutaka KITAMURA, et al.

Application. No.: 10/555,090

Group Art Unit: 2809

Confirmation No.: 9358

Examiner: Naishadh N. DESAI

Filed: November 2, 2005

For: VEHICULAR ROTATING ELECTRICAL MACHINE APPARATUS

REQUEST FOR REFUND

MAIL STOP 16

Director of the U.S. Patent and Trademark Office

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

The present Application was filed on November 2, 2005, containing a single independent claim. In response to the Office Action of June 7, 2007, Applicants submitted an Amendment wherein two (2) additional independent claims were added. A copy of the Amendment of September 7, 2007 is included. As such the present Application, as amended, includes three (3) independent claims.

However, the Legal Instrument Examiner has indicated that **four** (4) independent claims were included in the Amendment submitted on September 7, 2007. The Patent application Fee Determination Record completed by Audris Sias is enclosed herein. A fee of \$200.00 for the alleged additional claim was charged to Deposit account 19-4880 on September 12, 2007, as reflected on the enclosed USPTO Sales Receipt and USPTO Monthly Statement of Deposit Account.

REQUEST FOR REFUND
U.S. Application No. 10/555,090

Attorney Docket No. Q90831

Applicants hereby respectfully request a refund in the amount of \$200.00, as each presented claim has already been paid for. Applicants respectfully request for this refund to be credited to Deposit Account No. 19-4880.

Respectfully submitted,

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APPLICATION AS FILED – PART I						OTHER THAN				
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FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)		
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A			N/A			
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A		N/A			N/A			
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A			N/A			
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =		*	X \$	=		X \$	=		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =		*	X \$	=		X \$	=		
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL			TOTAL			
APPLICATION AS AMENDED – PART II						OTHER THAN				
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY OR		SMALL ENTITY		
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	Total (37 CFR 1.16(i))	* 11	Minus	** 21	= 0	X \$	=		X \$50=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***3	= 1	X \$	=		X \$200=	200
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
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	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
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EFS ID:	2173179
Application Number:	10555090
International Application Number:	
Confirmation Number:	9358
Title of Invention:	Vehicular Rotating Electrical Machine Apparatus
First Named Inventor/Applicant Name:	Yutaka Kitamura
Customer Number:	23373
Filer:	Kelly G. Hyndman/Alysia Durant
Filer Authorized By:	Kelly G. Hyndman
Attorney Docket Number:	Q90831
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Application Type:	U.S. National Stage under 35 USC 371

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PATENT APPLICATION
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Yutaka KITAMURA, et al.

Application. No.: 10/555,090

Group Art Unit: 2809

Confirmation No.: 9358

Examiner: Naishadh N. DESAI

Filed: November 2, 2005

For: VEHICULAR ROTATING ELECTRICAL MACHINE APPARATUS

AMENDMENT UNDER 37 C.F.R. § 1.111

MAIL STOP AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated June 7, 2007, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE CLAIMS	2
REMARKS	9

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A vehicular rotating electrical machine apparatus comprising:

a rotating electrical machine including a shaft rotatably supported by a pair of brackets having a suction hole at an end face and an exhaust hole at an outer periphery, a rotor disposed in the pair of brackets, fixed to the shaft, having a field winding mounted to an inside, and having cooling fans mounted to both end faces, and an armature fixed to the pair of brackets at an outer periphery of the rotor to surround the rotor and including an armature iron core on which an armature winding is wound, and

an inverter unit which converts DC power of a battery into AC power, supplies the AC power to the armature winding and causes the rotor to generate rotating power, or converts AC power generated in the armature winding into DC power and charges the battery, the inverter unit including an inverter module having plural switching elements and at least a field current control device for controlling the field current or a control device for controlling switching operations of the plural switching elements,

~~in which~~ wherein the inverter unit has a substantially hollow cylindrical shape or hollow polygonal prism shape, and ~~includes~~ a heat sink constructed with plural heat radiating fins formed of metal material in at least one part of an inner peripheral surface or an anti-bracket side end face or an outer peripheral surface, the inverter module and at least the field current control

device or the control device are mounted on the heat sink and a thermal conduction blocking portion is provided such that part of the heat sink on which the inverter module is mounted and the part of the heat sink on which the field current control device or the control device is mounted are not thermally influenced by each other, covered by a cover fixed to either one of the outer end faces of the paired brackets integrally and having a suction hole in the end face in an axis direction thereof ~~having many heat radiating fins at least part of an outer surface, and the inverter unit surrounds the shaft at an anti-load side end of the rotating electrical machine, and is~~ disposed to cause cooling air sucked through the suction hole of the cover in the axial direction by the cooling fan to cool the heat radiating fins before cooling of the rotating electrical machine.

2. (canceled).

3. (currently amended): A vehicular rotating electrical machine apparatus comprising: ~~according to claim 1, characterized in that the inverter unit includes the~~

a rotating electrical machine including a shaft rotatably supported by a pair of brackets having a suction hole at an end face and an exhaust hole at an outer periphery, a rotor disposed in the pair of brackets, fixed to the shaft, having a field winding mounted to an inside, and having cooling fans mounted to both end faces, and an armature fixed to the pair of brackets at an outer periphery of the rotor to surround the rotor and including an armature iron core on which an armature winding is wound, and

an inverter unit which converts DC power of a battery into AC power, supplies the AC power to the armature winding and causes the rotor to generate rotating power, or converts AC power generated in the armature winding into DC power and charges the battery, the inverter unit including an inverter module having plural switching elements and at least a field current control device for controlling the field current or a control device for controlling switching operations of the plural switching elements,

wherein the inverter unit has a substantially hollow cylindrical shape or hollow polygonal prism shape and a heat sink ~~having the many~~ constructed with plural heat radiating fins ~~made~~ formed of metal material in at least one ~~place~~ part of a bracket side end face and an outer peripheral surface, ~~is integrally fixed to an outside end face of one of the pair of brackets~~ the inverter module and at least the field current control device or the control device are mounted on the heat sink and a thermal conduction blocking portion is provided such that part of the heat sink on which the inverter module is mounted and the part of the heat sink on which the field current control device or the control device is mounted are not thermally influenced by each other, ~~and is covered by a cover provided with many~~ fixed to either one of the outer end faces of the paired brackets integrally and having plural suction holes ~~at an~~ on the outer peripheral surface, and

~~the inverter unit is~~ disposed to cause cooling air sucked ~~by the cooling fan~~ through the suction hole ~~of~~ in the outer peripheral surface of the cover by the cooling fan to cool the heat radiating fins before cooling of the rotating electrical machine.

4. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 13, characterized in that part of or all of the heat radiating fins are radially disposed substantially toward a center direction.

5. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 13, characterized in that part of or all of the heat radiating fins are disposed substantially in parallel to the shaft and to expand radially from a center direction.

6. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 31, characterized in that a partition wall or an air-guide wall to control an exhaust direction is provided to the cover or the bracket to which the inverter unit is fixed, so that high temperature exhaust cooling air exhausted from the exhaust hole provided in the outer periphery of the bracket is not circulated to and sucked through the suction hole of the cover.

7. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 21, characterized in that raw material of the cover is metal.

8. (currently amended): A vehicular rotating electrical machine apparatus comprising: ~~according to claim 1, characterized in that the inverter unit includes the~~

a rotating electrical machine including a shaft rotatably supported by a pair of brackets having a suction hole at an end face and an exhaust hole at an outer periphery, a rotor disposed in the pair of brackets, fixed to the shaft, having a field winding mounted to an inside, and having cooling fans mounted to both end faces, and an armature fixed to the pair of brackets at an outer periphery of the rotor to surround the rotor and including an armature iron core on which an armature winding is wound, and

an inverter unit which converts DC power of a battery into AC power, supplies the AC power to the armature winding and causes the rotor to generate rotating power, or converts AC power generated in the armature winding into DC power and charges the battery, the inverter unit including an inverter module having plural switching elements and at least a field current control device for controlling the field current or a control device for controlling switching operations of the plural switching elements,

wherein the inverter unit has a substantially hollow cylindrical shape or hollow polygonal prism shape and a heat sink ~~having the many~~ constructed with plural heat radiating fins ~~made of~~ formed of metal material ~~at least one place of~~ in at least one part of an inner peripheral surface, or an a bracket side end face, or ~~and~~ an outer peripheral surface, the inverter module and at least the field current control device or the control device are mounted on the heat sink and a thermal conduction blocking portion is provided such that part of the heat sink on which the inverter module is mounted and the part of the heat sink on which the field current control device or the control device is mounted are not thermally influenced by each other, ~~is integrally fixed to an inside end face of one of the pair of brackets~~ fixed to either one of the inner end faces of the paired brackets integrally and ~~the rotor and the armature are~~ partitioned by a substantially donut-

shaped partition plate ~~with~~ integrally fixed to either one of the inner side end faces of the paired brackets and having a through hole ~~at a center~~ opened at a center between the rotor and the armature; and

~~the inverter unit is~~ disposed to cause cooling air sucked through the suction hole ~~of~~ in the end face of the brackets ~~in an axial direction~~ by the cooling fan to cool the heat radiating fins before cooling of the rotating electrical machine.

9. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 87, characterized in that the partition plate is integrally fixed to the inverter unit.

10-14. (canceled).

15. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim ~~40~~1, characterized in that the switching elements includes SiC-MOSFETs using SiC composition material.

16. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim ~~40~~1, characterized in that the switching elements include SiC-SITs using SiC composition material.

17. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to ~~any one of claims~~ claim 1 ~~to 5~~, characterized in that the rotor includes
- a rotor iron core including a magnetic pole part formed into a claw-pole type in which adjacent magnetic poles are different from each other and a cylindrical part having the field winding, and
- a permanent magnet which is provided in a magnetic circuit of the rotor iron core and supplies, together with the field winding, a magnetic flux to the armature iron core.

REMARKS

I. Formal Matters

Claims 1, 3-9 and 15-17 are all the claims pending in the present Application. By this Amendment, Applicants amend claims 1, 3-9 and 15-17. Applicants also cancel claims 2 and 10-14.

With regard to the Information Disclosure Statement (IDS) filed on November 2, 2005, the Examiner contends that it is improper. Specifically, the Examiner asserts that the IDS fails to comply with 37 C.F.R. § 1.98 because the references listed on the PTO/SB/08 form have not been provided. Applicants respectfully disagree.

Applicants respectfully note that a copy of the International Search Report in a counterpart Application was submitted along with the IDS of November 2, 2005. The International Search Report caused the references to be listed in the IDS. Further, the USPTO should have received copies of the references cited in the International Search Report from the International Bureau. Based on Applicant's review of the Image File Wrapper at USPTO website, it appears that the references have not been received from the International Bureau.

In the IDS of November 2, 2005, Applicants also noted that any reference not received from the International Bureau would be furnished by the Applicants upon request. As such, Applicants assert that the IDS filed on November 2, 2005 was proper and no additional fee is required at this time. Additionally, for the Examiner's convenience, Applicants attach a copy of the references cited in the International Search Report that were not received from the International Bureau.

Applicants thank the Examiner for considering the JP 11-180162 reference.

II. Claim Rejections

The Examiner has rejected claims 1-6, 9 and 14 under 35 U.S.C. § 102(b) as allegedly being anticipated by Ihata (U.S. Patent No. 6,198,188). Additionally, the Examiner has rejected claims 7 and 8 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ihata. The Examiner has also rejected claims 10-13 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ihata as applied to claim 1 above, in view of Kinoshita et al. (U.S. Patent No. 5,517,401). Applicants respectfully disagree.

Ihata relates to a rectifier cooling fin arrangement of a vehicle AC generator. For this purpose, Ihata discloses a rectifier (6) which has a plurality of “cooling fins.” Further, the rectifier 6 is fixed to the rear frame (5) which holds the rotor (3) and the stator (2). The rotor (3) of Ihata also includes cooling fans (36) attached to the front and rear side of the rotor. The rectifier (6) of Ihata is covered by a rear cover (9), which has a plurality of air intake windows located on its rear wall. Additionally, the rectifier (6) of Ihata is used to convert three-phase AC power generated by the stator winding into DC power.

With regard to claim 1, the Examiner has already conceded that Ihata fails to teach, or even suggest, an inverter module, a field control device or a control device. (See Office Action, page 9, with respect to the elements of claims 10-13). However, the Examiner attempts to cure this deficiency by relying on Kinoshita. Applicants respectfully assert that Kinoshita fails to cure the deficient disclosure of Ihata.

Specifically, even if, *arguendo*, Kinoshita taught all of the elements asserted by the Examiner, it would still fail to teach, or even suggest, at least “the inverter module and at least the field current control device or the control device [being] mounted on the heat sink and a

thermal conduction blocking portion is provided *such that part of the heat sink on which the inverter module is mounted and the part of the heat sink on which the field current control device or the control device is mounted **are not thermally influenced by each other**,*” as recited in claim 1.

In other words, in one exemplary embodiment of the present invention, the heat sink is separated by a thermal conduction blocking portion. In this exemplary embodiment, the inverter module is mounted on one side of the heat sink while the control device is mounted on the other part of the heat sink. As a result, the two parts of the heat sink are not thermally influenced by each other. Moreover, the inverter module and the control unit, connected to the respective parts of the heat sink, are also not thermally influenced by each other.

Instead, neither Kinoshita nor Ihata teach a “thermal conduction blocking portion” nor do they teach the specific location of the control element or the inverter module on the heat sink. For at least this reason, Applicants respectfully assert that claim 1 is allowable over the cited art of record.

Additionally, with regard to claim 1, Ihata fails to teach, or even suggest, at least an “inverter unit [which has] **a heat sink having many heat radiating fins** on at least part of an outer surface.” That is, the inverter unit, according to an exemplary embodiment of the present invention, includes a heat sink, wherein the heat sink has a plurality of heat radiating fins.

In the Office Action of June 7, 2007, the Examiner states “Fig 3B of Ihata shows the rectifier unit (element 6) including **heat sink elements 62 and 63**.” (See Office Action, page 7,

¶12). However, the Examiner relies on the same elements as allegedly disclosing the plurality of heat radiating fins. This is improper.

It is well known that, when examining the claims of an application, “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.” MPEP § 2143.03; see also *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Additionally, “[w]hen evaluating claims for obviousness under 35 U.S.C. § 103, **all the imitations of the claims must be considered and given weight**. MPEP § 2143.03; see also *Ex parte Grasselli*, 231 USPQ 393 (Bd. App. 1983) *aff’d mem.* 738 F.2d 453 (Fed. Cir. 1984).

In this case, the Examiner’s interpretation of the claim is impermissibly broad. With regard to claim 1, the Examiner gives no patentable weight to the “having many **heat radiating fins** on at least part of an outer surface” limitation. That is, the Examiner seems to assert that “heat sink elements 62 and 63” of Ihata correspond to **both** the heat sink, and the “many heat radiating fins.” This is clearly improper. For at least this additional reason, Applicants respectfully assert that claim 1 is allowable over the cited art of record.

With regard to claims 2 and 10-14, these claims have been canceled. As such, Applicants respectfully assert that the rejection of these claims is now moot.

With respect to claim 3 and 8, Applicants respectfully assert that claims 3 and 8 are allowable for reasons analogous to those recited with respect to claim 1. They are also allowable because of the additional limitations recited therein.

With respect to claims 4-7, these claims depend from independent claim 1. As such, these claims are allowable at least by virtue of their dependency from claim 1. They are also allowable because of the additional limitations recited therein.

For example, Ihata does not describe the specific layout of the plurality of cooling fins, as set forth in claims 4 and 5. Specifically, as described with respect to claim 1 above, the Examiner regards “cooling fins 62 and 63” as corresponding to the heat sink. However, claims 4 and 5 are directed to the cooling fins which are located on at least the outer surface of the heat sink, and are **not the heat sink itself**. As described above, a heat sink **is not the same as a heat radiating fin**. For at least this additional reason, Applicants respectfully assert that claims 4 and 5 are not anticipated, or rendered obvious, in view of the cited art of record.

With respect to claim 9, this claim depends from independent claim 8. As such, Applicants respectfully assert that claim 9 is allowable at least by virtue of its dependency from claim 8.

Next, the Examiner has rejected claims 15 and 16 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ihata in view of Kinoshita as applied to claim 10 and in further view of Sato (U.S. Patent No. 5,731,689). Applicants respectfully disagree.

With regard to claims 15 and 16, these claims depend from independent claim 1. As such Applicants respectfully assert that claims 15 and 16 are patentable at least by virtue of their dependency from claim 1. Additionally, Applicants have already demonstrated the deficient disclosure of Ihata and Kinoshita, as applied to independent claim 1. The Examiner relies on Sato only for its alleged disclosure of a “MOSFET using SiC in a SiC-SIT structure.” As such,

even if, *arguendo*, Sato disclosed all of the additional limitations of claims 15 and 16 as the Examiner asserts, it would still fail to cure the deficient disclosure of Ihata and Kinoshita.

The Examiner has also rejected claim 17 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ihata as applied to claims 1-5, in view of Kusase et al. (U.S. Patent No. 5,793,144). Applicants respectfully disagree.

With regard to claim 17, this claim depends from independent claim 1. As such Applicants respectfully assert that claim 17 is patentable at least by virtue of its dependency from claim 1. Additionally, Applicants have already demonstrated the deficient disclosure of Ihata, as applied to independent claim 1. The Examiner relies on Kusase only for its alleged disclosure of the additional limitations of claim 17. As such, even if, *arguendo*, Kusase disclosed all of the additional limitations of claim 17, as the Examiner asserts, it would still fail to cure the deficient disclosure of Ihata.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

This Application is being filed via the USPTO Electronic Filing System (EFS). Applicants herewith petition the Director of the USPTO to extend the time for reply to the above-identified Office Action for an appropriate length of time if necessary.

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No.: 10/555,090

Attorney Docket No.: Q90831

Any fee due under 37 U.S.C. § 1.17(a) is being paid via the USPTO Electronic Filing System (EFS). The USPTO is also directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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